

IN THE CLAIMS:

- 1 1. (Currently amended) A device, ~~for providing displacement or velocity~~
2 ~~information, said device~~ comprising a housing holding a sensor, said sensor
3 including a coil and a captive core, wherein an electrical measurement of said coil
4 provides information about at least one from the group including displacement of
5 said captive core or and velocity of said captive core, further wherein said coil has
6 an axis extending in a first direction, wherein said housing has a minimum outside
7 dimension that is less than 3.00 mm when measured perpendicular to said first
8 direction, wherein said housing further comprises a support for said captive core,
9 wherein resistance to lateral force provided by said support is independent of
10 displacement of said core.
- 1 2. (Original) A device as recited in claim 1, wherein said housing has a minimum
2 outside dimension that is less than 2.50 mm when measured perpendicular to said
3 first direction.
- 1 3. (Original) A device as recited in claim 1, wherein said housing has a minimum
2 outside dimension that is less than 2.00 mm when measured perpendicular to said
3 first direction.
- 1 4. (Original) A device as recited in claim 1, wherein said housing has a minimum
2 outside dimension that is less than 1.80 mm when measured perpendicular to said
3 first direction.
- 1 5. (Original) A device as recited in claim 1, wherein said housing has a minimum
2 outside dimension that is less than 1.60 mm when measured perpendicular to said
3 first direction.
- 1 6. (Original) A device as recited in claim 1, wherein said housing has a minimum
2 outside dimension that is less than 1.40 mm when measured perpendicular to said
3 first direction.
- 1 7. (Original) A device as recited in claim 1, wherein said captive core extends into
2 said coil.
- 1 8. (Currently amended) A device as recited in claim 1, wherein said captive core has
2 a first portion having a first diameter, wherein said captive core further includes a
3 second portion having a diameter greater than said first diameter for retaining said
4 core within said housing, and wherein said ~~captured~~ captive core is supported in
5 said housing by a first bearing and by a second bearing.

- 1 9. (Original) A device as recited in claim 8, wherein said first bearing is connected to
2 said housing, wherein said core slides within a hole in said first bearing.
- 1 10. (Currently amended) A device as recited in claim 8, wherein said second bearing
2 is mechanically mounted to at least one from the group including said coil or ~~to~~
3 and said housing, wherein said core slides within a first hole in said first bearing,
4 and wherein said core slides within a second hole in said second bearing, ~~when in~~
5 ~~said core extends out from said housing from said first bearing, wherein said~~
6 ~~second bearing is spaced a distance from said first bearing to provide said~~
7 ~~resistance to lateral forces on said core where it said core extends from said~~
8 ~~housing while allowing free axial movement of said core.~~
- 1 11. (Original) A device as recited in claim 8, wherein said second bearing is integral
2 with said second portion and mechanically connected to said core, wherein said
3 second bearing moves with said core.
- 1 12. (Original) A device as recited in claim 11, wherein said first bearing and said
2 second bearing are jewel bearings.
- 1 13. (Original) A device as recited in claim 11, wherein said captive core comprises
2 steel, stainless steel, titanium, aluminum, plastic, or a super-elastic material.
- 1 14. (Original) An sensor as recited in claim 13, wherein said superelastic material
2 comprises nitinol.
- 1 15. (Original) A device as recited in claim 1, wherein said displacement or velocity
2 sensor comprises an inductive sensor or an eddy current sensor.
- 1 16. (Original) A device as recited in claim 15, wherein said inductive sensor or said
2 eddy current sensor is a one-coil device.
- 1 17. (Original) A device as recited in claim 15, wherein said inductive sensor or said
2 eddy current sensor is a two-coil device.
- 1 18. (Original) A device as recited in claim 15, wherein said inductive sensor or said
2 eddy current sensor is a three-coil device.
- 1 19. (Original) A device as recited in claim 1, wherein said sensor further comprises a
2 spring to provide a return force to said core.

- 1 20. (Original) A device as recited in claim 19, wherein said core extends through said
2 spring and into said coil.
- 1 21. (Original) A device as recited in claim 1, wherein said core includes a
2 ferromagnetic material.
- 1 22. (Original) A device as recited in claim 21, wherein said ferromagnetic portion
2 comprises iron, nickel, ferrite, or steel.
- 1 23. (Original) A device as recited in claim 1, wherein said core further comprises a
2 contact point for making contact with an object to be measured, wherein said
3 contact point is made of a hard material that resists wear.
- 1 24. (Original) A device as recited in claim 23, wherein said hard material comprises
2 alumina, ruby, sapphire or hardened steel.
- 1 25. (Currently amended) A device as recited in claim ~~1~~ 19, wherein said core further
2 comprises a core stop to capture said core within said housing, wherein said core
3 stop further limits extension of said spring.
- 1 26. (Currently amended) A device as recited in claim ~~1~~ 25, wherein said housing has
2 an inside diameter, and wherein said core stop is sized to have an outside diameter
3 approximately equal to said inside diameter to provide a bearing function for
4 guiding said core.
- 1 27. (Original) A device as recited in claim 1, further comprising lead wires
2 electrically connected to said coil and extending to a circuit.

- 1 28. (Currently amended) A device for providing displacement information,
2 comprising a housing, ~~having an inner surface within said~~ having a housing, ~~said~~
3 ~~inner surface having an inner-surface-inside dimension,~~ said housing for holding a
4 displacement sensor and a guidance mechanism, said displacement sensor
5 including a coil and a captive core, said captive core having a core-outside
6 dimension, wherein said guidance mechanism comprises a first bearing and a
7 second bearing for guiding said core, wherein said first bearing is connected to
8 said housing, wherein said first bearing has an axial hole having an axial-hole
9 dimension about equal to said core-outside dimension, wherein said core slidably
10 extends through said axial hole, wherein said second bearing has a second-
11 bearing-outside dimension about equal to said ~~housing~~ ~~inner-surface-inside~~
12 dimension, wherein said guidance mechanism is for resisting lateral movement
13 ~~and lateral rotation~~ of said core while allowing axial movement of said core into
14 and out of said coil, ~~wherein said inner-surface-inside dimension is greater than~~
15 ~~inside diameter of said coil, wherein said captive core has a stroke length, wherein~~
16 ~~said captive core has a first length of contact with said first bearing, wherein said~~
17 ~~captive core has a second length of contact with said second bearing, wherein said~~
18 ~~first length of contact is less than said stroke length and wherein said second~~
19 ~~length of contact is less than said stroke length.~~
- 1 29. (Original) A device as recited in claim 28, wherein said second bearing is
2 connected to said captive core.
- 1 30. (Original) A device as recited in claim 28, wherein said second bearing is
2 connected to said housing or connected to said coil.
- 1 31. (Currently amended) A device as recited in claim 28, wherein said second bearing
2 includes is connected to said coil.
32. Cancel.
- 1 33. (Original) A device as recited in claim 28, wherein said coil has an axis extending
2 in a first direction, wherein said housing has a housing outside dimension,
3 wherein said housing has a minimum outside dimension that is less than 3.00 mm
4 when measured perpendicular to said first direction.
- 1 34. (Original) A device as recited in claim 28, further comprising a spring for spring
2 loading said core.

- 1 35. (Original) A system for providing displacement or velocity information,
2 comprising an array of displacement sensors capable of providing displacement or
3 velocity measurements, wherein said displacement or velocity measurements are
4 on center to center spacing of less than 3mm.
5
6 36. (New) A device as recited in claim 10, wherein said core extends out from said
7 housing from said first bearing, wherein said second bearing is spaced a distance
8 from said first bearing to provide said resistance to lateral forces on said core
9 where it said core extends from said housing while allowing free axial movement
10 of said core